

**DEPARTMENT OF TRANSPORTATION****DIVISION OF ENGINEERING SERVICES**

Office of Structural Materials

Quality Assurance and Source Inspection



Bay Area Branch  
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Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 69.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-000101**Date Inspected:** 15-Mar-2007**Project Name:** SAS Superstructure**OSM Arrival Time:** 800**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1730**Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **Location:** Shanghai, China**CWI Name:** Liu Liu**CWI Present:** Yes No**Inspected CWI report:** Yes No N/A**Rod Oven in Use:** Yes No N/A**Electrode to specification:** Yes No N/A**Weld Procedures Followed:** Yes No N/A**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:** Yes No N/A**Approved Drawings:** Yes No N/A**Approved WPS:** Yes No N/A**Delayed / Cancelled:** Yes No N/A**Bridge No:** 34-0006**Component:****Summary of Items Observed:**

The CALTRANS Quality Assurance (QA) Inspector, Alfredo Acuna was present for the welding qualification testing pertinent for the welding qualification record (PQR) HP200712-3 scheduled for this project. ZPMC, welder operator Zhan Xing Jin was observed by the QA Inspector performing welding operations following the preliminary welding procedure specification PWPS-B-T-223(2)1T-1 for the PQR identified as HP200712-3. Base metal was designated as A-709-50-2/Z25 (Heat # 06102938N) and appeared to meet the non fracture critical impact test requirement. The root opening of the joint was approximately 6 mm. ZPMC followed AWS 5.13 the production procedure WPS using the automatic submerged arc welding (SAW) process in the flat (1G) position with the 4.8 mm diameter EH-14 electrode. The QA Inspector verified amperages, voltages, travel speeds, preheat and heat interpass temperatures. The QA inspectors recorded welding parameters for a total of 29 passes. The QA inspectors observed that the welding parameters taken by Quality Control (QC) inspector Cheng Libin and ZPMC QA inspector Hu Gang appeared to be accurate and in accordance with the contract documents. ZPMC QC (CWI) Liu Liu witnessed the testing and performed visual weld inspections.

Note: The PQR was in process at the end of the shift.

**Summary of Conversations:**

The QA inspection had a conversation with American Bridge/Flour Enterprises, JV (ABF) Welding Engineer Craig Knops. The QA inspector brought to the attention of Mr. Knops that ZPMC did not follow his recommendations and decided to continue welding the PQR HP 200712-3 (in this test specimen was observed a crack outside of the area of interest). Mr. Knops relayed to the QA inspector that he was sad that ZPMC decided to continue welding, but that he could not direct ZPMC to stop. Mr. Knops stated that if cracking was observed in production that ZPMC would stop using this electrode.

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The QA inspectors had a conversation with ZPMC representatives. The QA inspector recommended performing magnetic particle testing (MT) to the root passes for PQR HP 200712-1 and HP 200712-2 (rejected previously by ZPMC). ZPMC performed MT verifications to the PQR test coupons. ZPMC observed that the first and second test specimens had root cracks on the weld metal. The QA inspector concurred with ZPMC observations.

The QA inspector had a conversation with the Caltrans Task Leader Dave McClary. The QA inspector Mike Hasler and the QA inspector brought to the attention of Mr. McClary that the welds that failed on the PQR HP200712-1 and HP200712-2 were concave shapes which have a tendency to cause centerline cracking when are using in procedures or with electrodes that develop too concave bead shape (solidification at the centerline of the weld combined with surface tensions due to shrinkage could be a cause centerline cracking).

The digital photograph below shows the concave root bead for the PQR HP200712-2.



### Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Mazen Wahbeh, (818) 292-0659, who represents the Office of Structural Materials for your project.

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| <b>Inspected By:</b> | Acuna,Alfredo |
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| Quality Assurance Inspector |
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| <b>Reviewed By:</b> | McClary,David |
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| QA Reviewer |
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